The Importance of a Real-Time Data Infrastructure for IIOT, Advanced Analytics, & Big Data

Rick Howell – Real-Time Data Supervisor, Devon Energy

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Outline

- **Overview of the PI System at Devon**

- **Devon Energy's Digital Transformation**

- **Role of The PI System and the PI Integrators for BA**

- **Use Case Examples**

- **Community Model – Coiled Tubing**

- **Streaming In Memory Analytics**

- **Best Practices**

A Leading North American E&P

- **Focused and balanced asset portfolio**

  — Proved reserves: 2.2 Billion BOE

  — Net production: 680 MBOED

  — Upstream revenue: 60% liquids

- **Stable Production**

  — 5.5 Million operated acres

  — 30,000 producing wells

  — World-class heavy oil projects

  — Top-tier liquids-rich gas plays

- **Delivering visible, low-risk production growth**

Note: All figures represent Devon's retained asset portfolio.

Heavy Oil

Rockies Oil

STACK

Delaware Basin

Barnett Shale

Eagle Ford

● Oil Assets

● Liquids-Rich Gas Assets

Devon's Digital Transformation
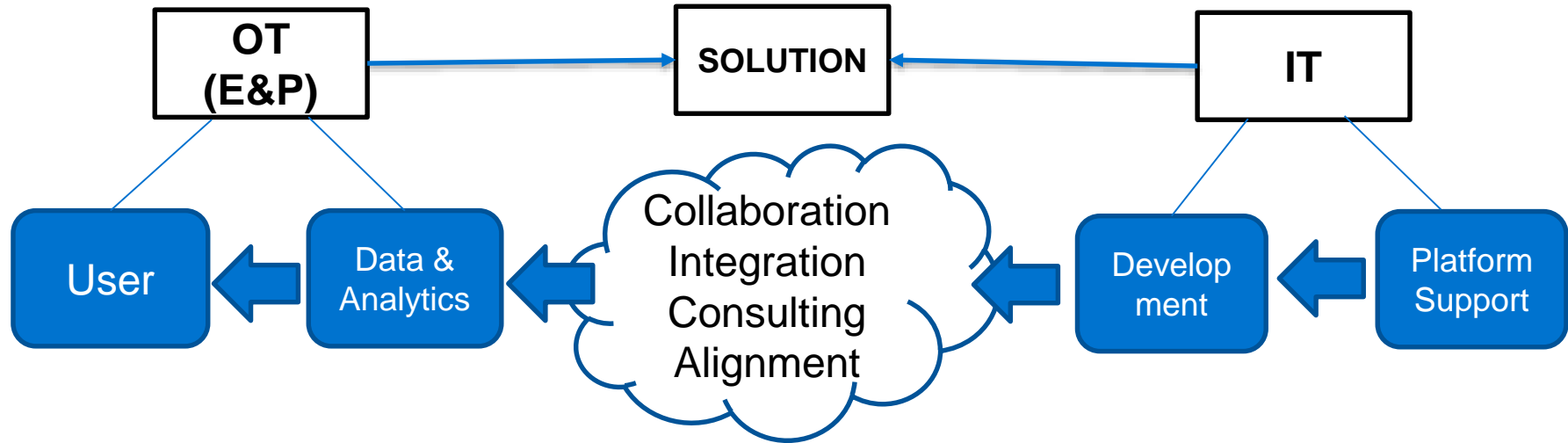## Focus on Productivity, Lifting Costs, & Empowerment

2011   **Data Management and Governance**

2012   **Automation & Communication OSIsoft EA**

2013   **Production DSC's***

2014   **WellCon DSC***

2015   **Analytics**
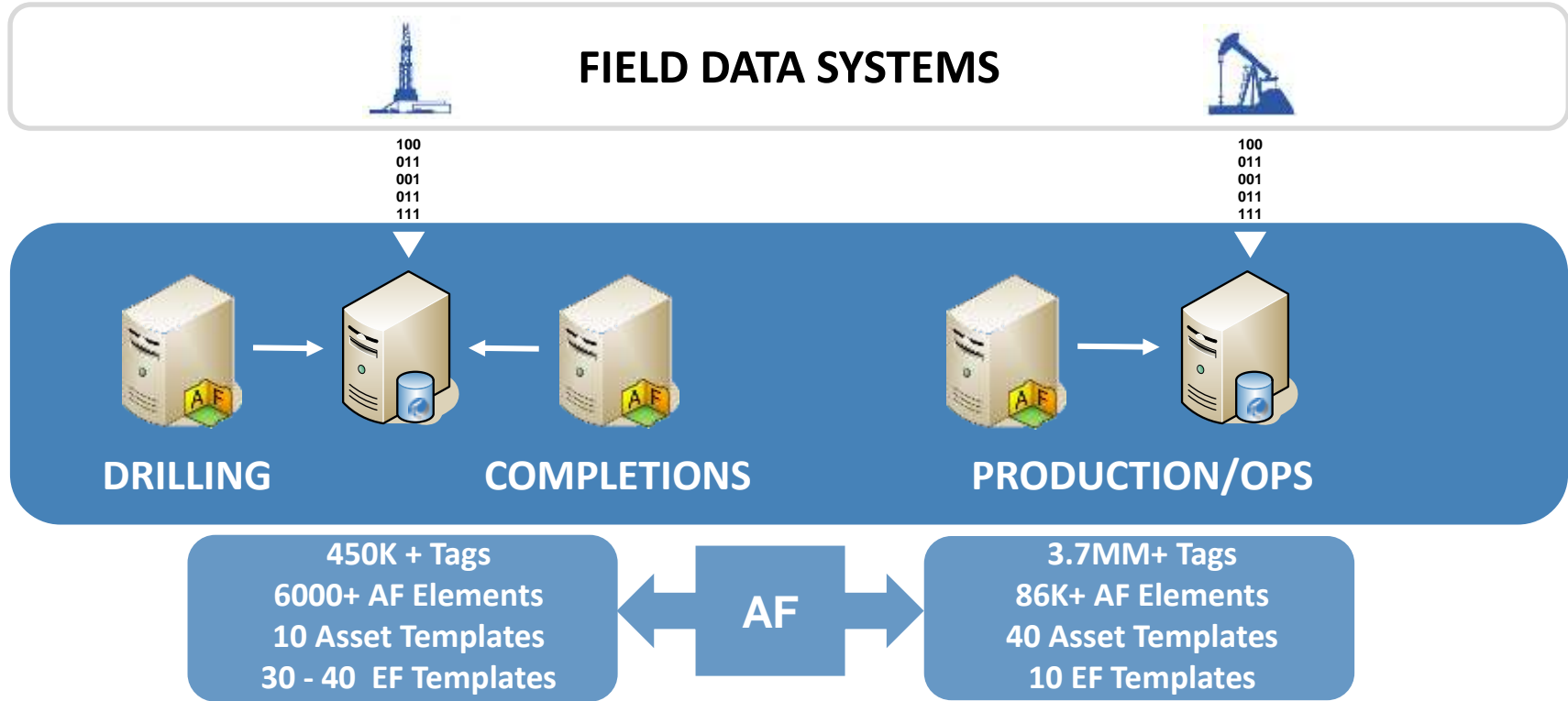
***Decision Support Centers**
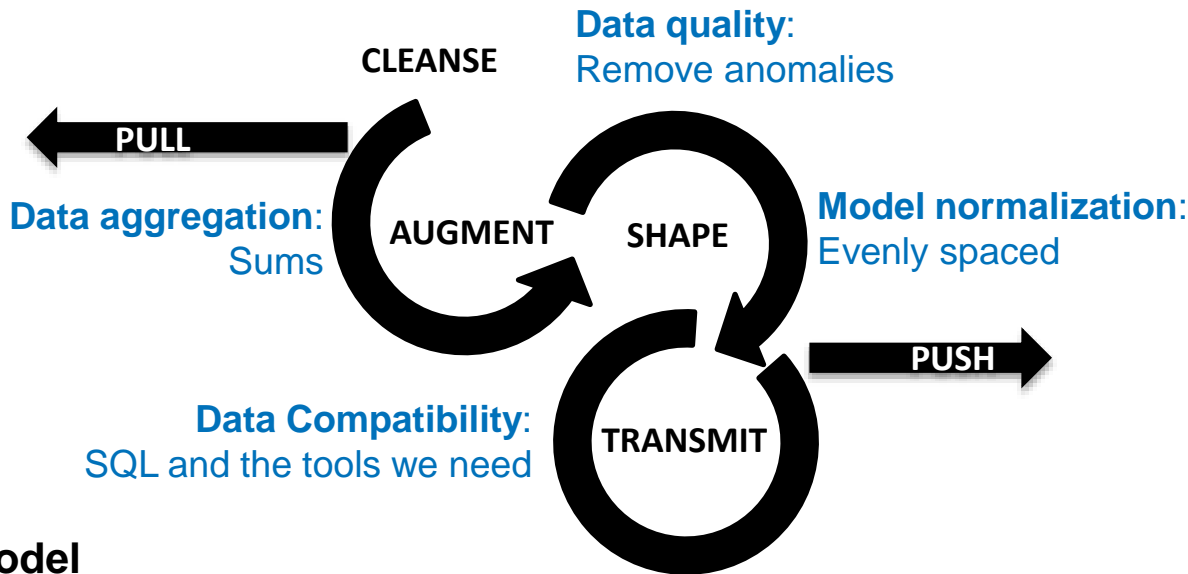
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Devon's Digital Transformation
Our Organization

A Continuing Journey with the EA (2012)

FIELD DATA SYSTEMS

100
011
001
011
111

100
011
001
011
111

DRILLING

COMPLETIONS

PRODUCTION/OPS

450K + Tags
6000+ AF Elements
10 Asset Templates
30 - 40 EF Templates

AF

3.7MM+ Tags
86K+ AF Elements
40 Asset Templates
10 EF Templates

PI Asset Framework – The Foundation

- **Our Evolution with PI AF – a Journey**

- **The power of smart asset and analysis templates**

- **Driving standardization and simplification**

- **Enableing new operating models (WellCon)**

- **Enables distributed analytics and self serve BI**

- **IIOT**

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# PI Integrator for Business Analytics – Self Service BI

CLEANSE

Data quality:
Remove anomalies

PULL

Data aggregation:
Sums

AUGMENT

SHAPE

Model normalization:
Evenly spaced

Data Compatibility:
SQL and the tools we need

TRANSMIT

PUSH

**PI AF OT Data Model
is Foundational for
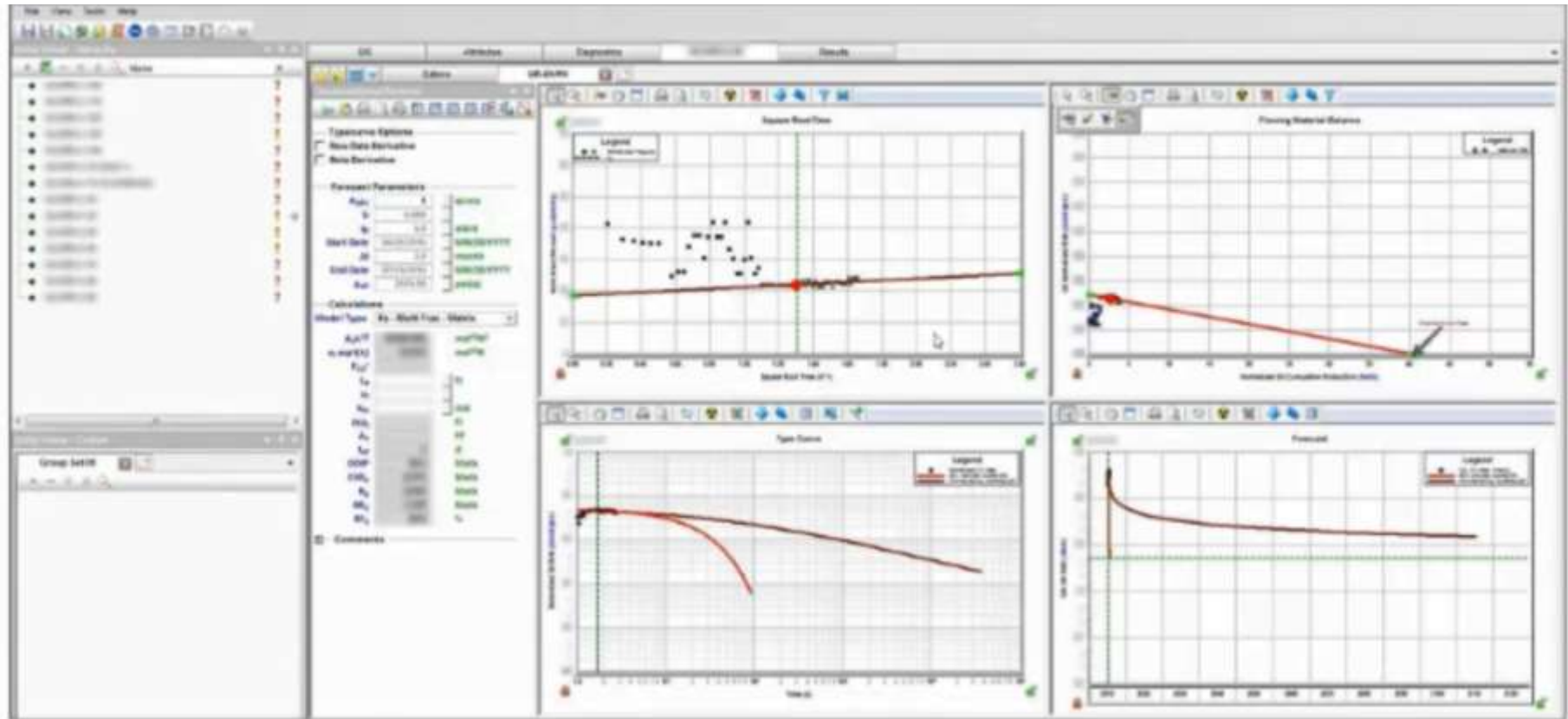the Integrators**

Use Case Examples

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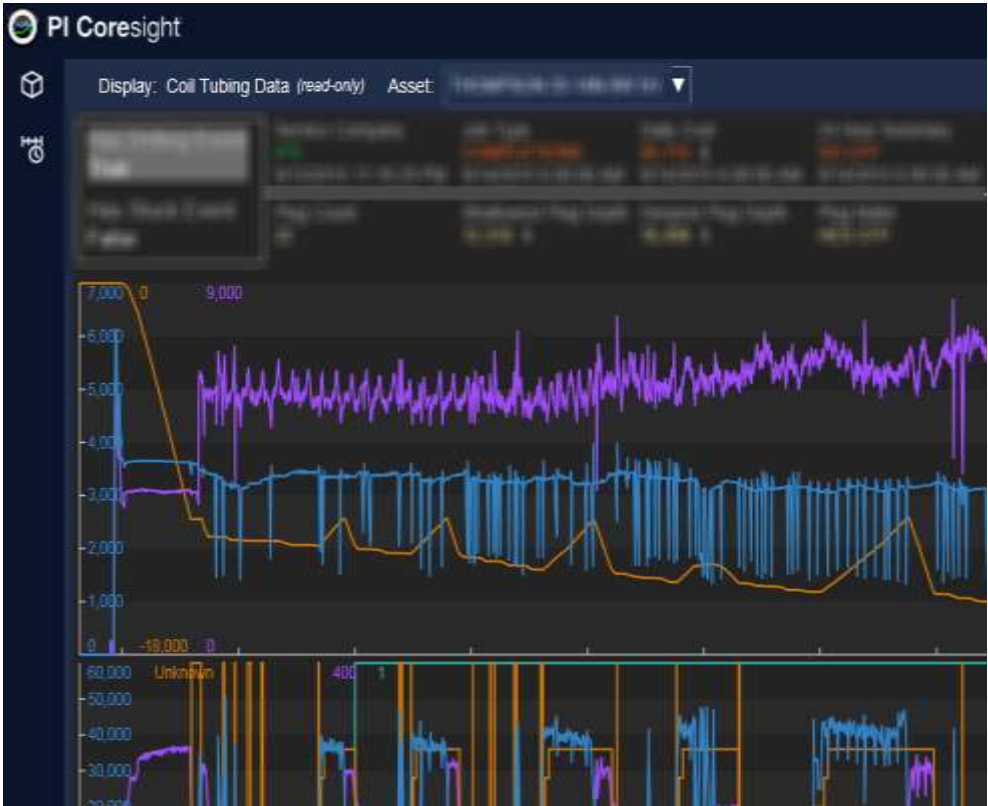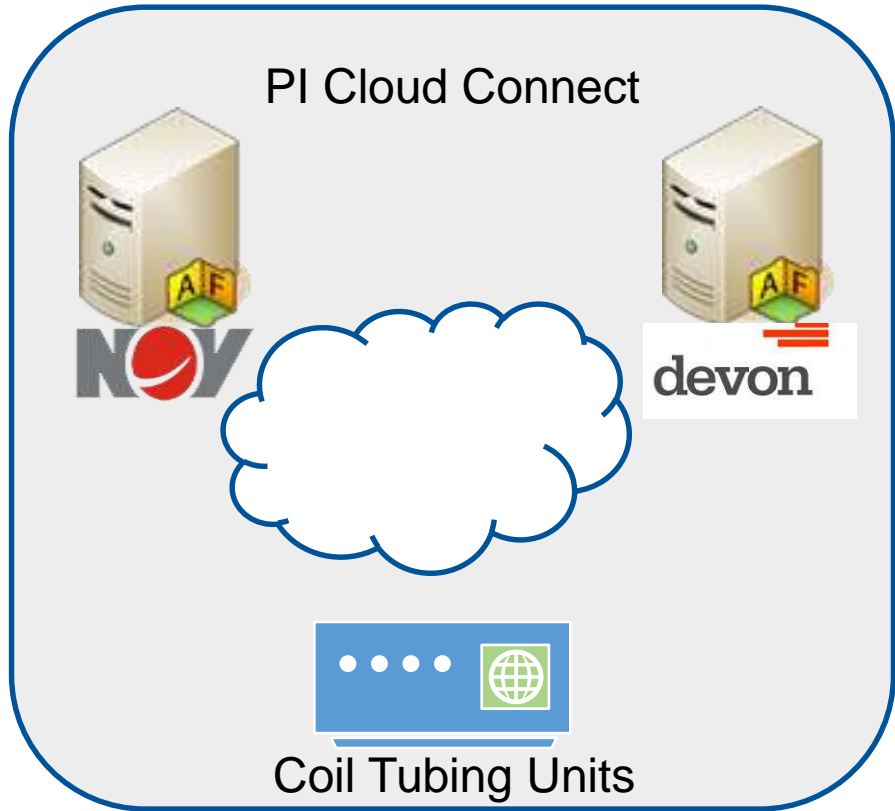# Integration with ESRI – Tank Battery Analysis
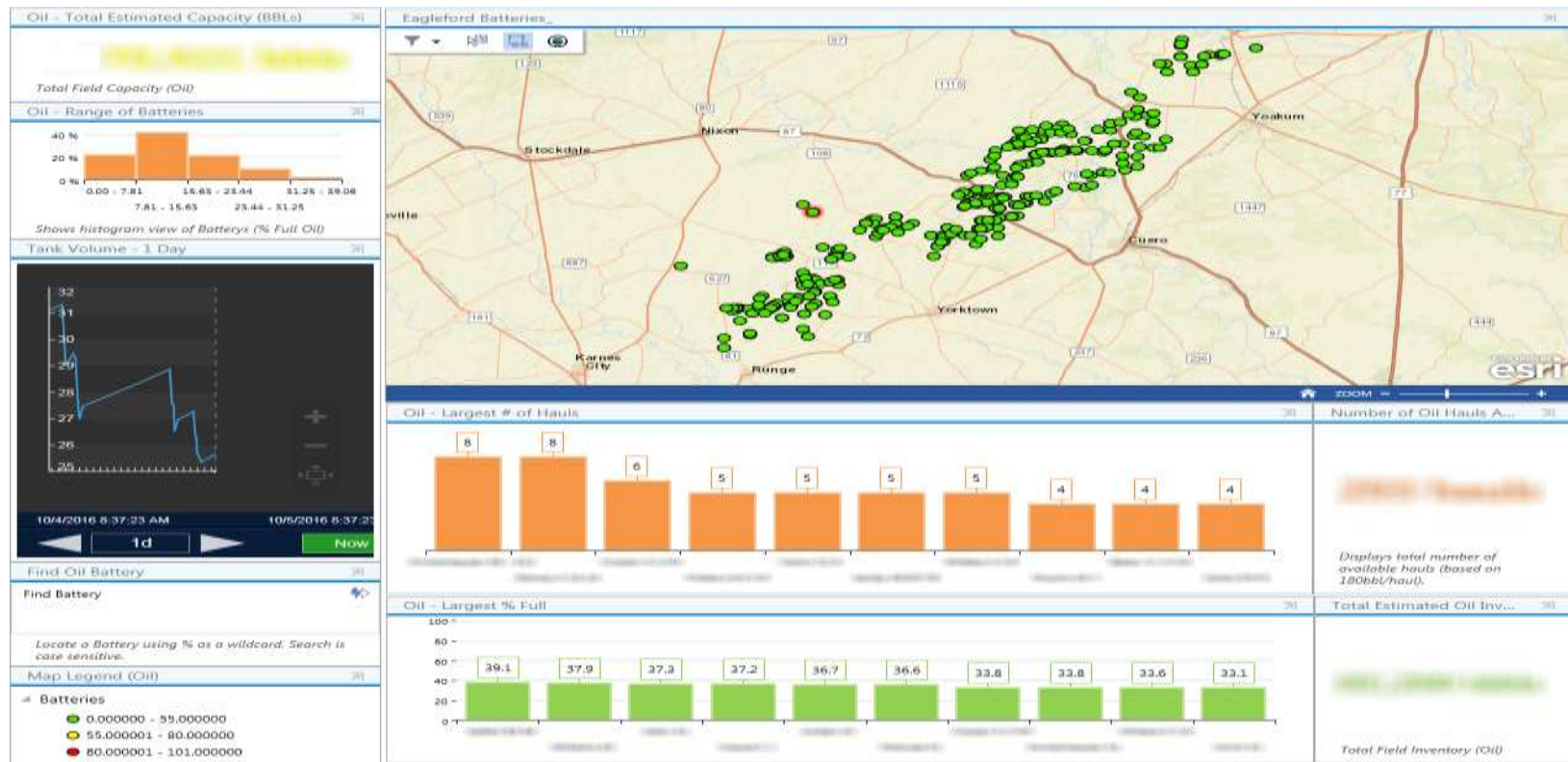
Drilling Phase Performance Comparison
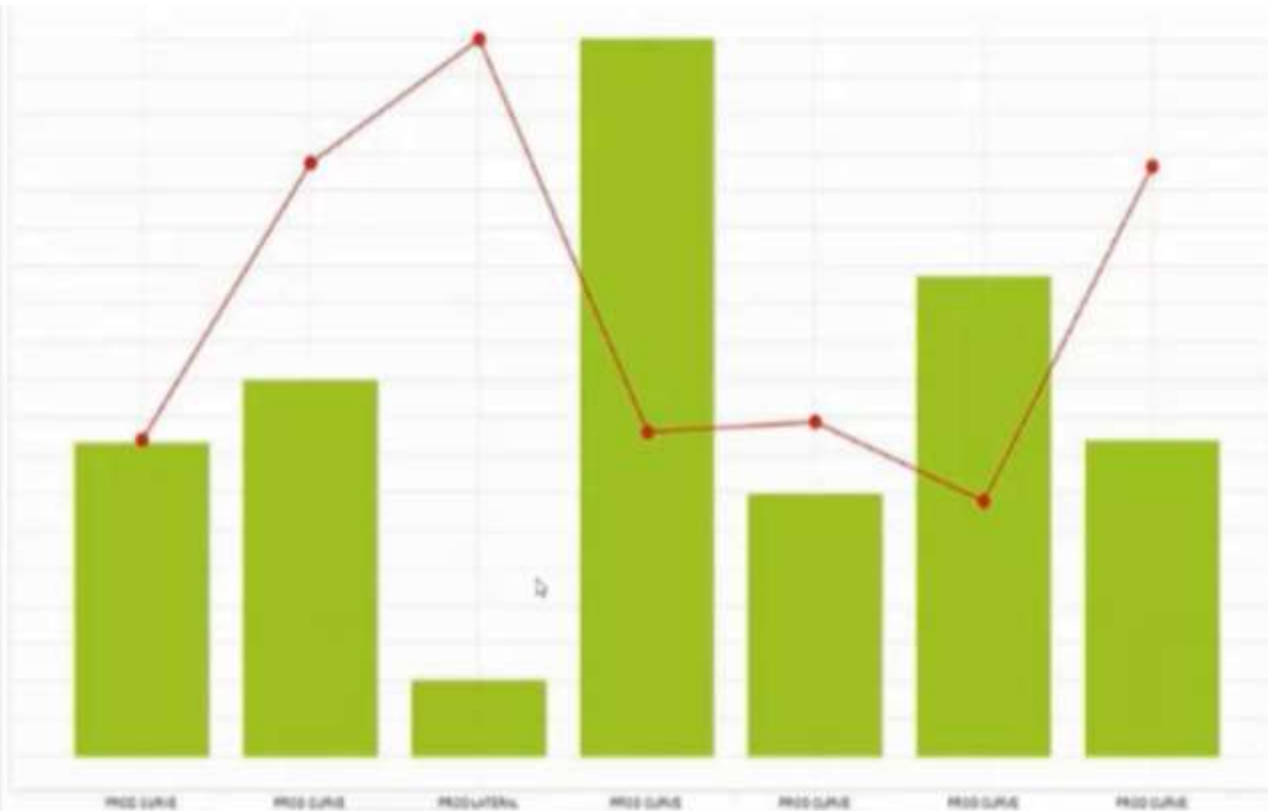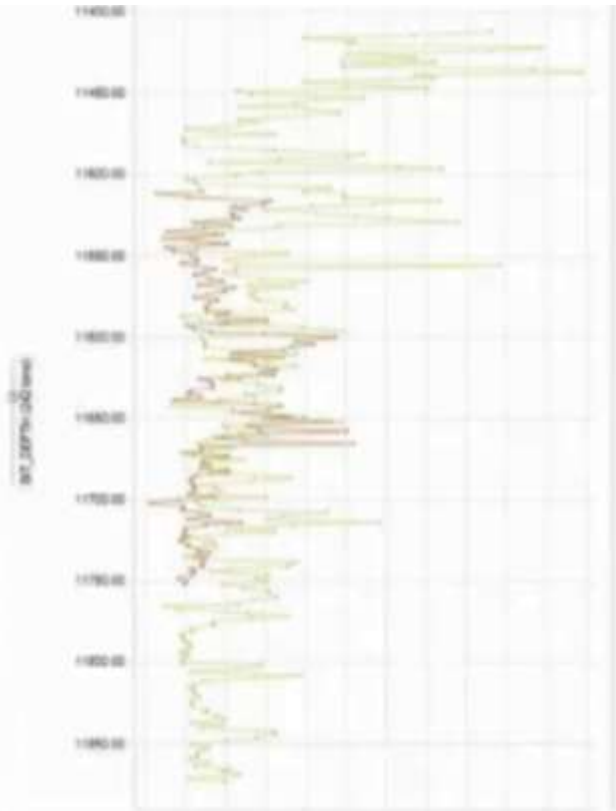
Reservoir Analysis in IHS Harmoney

Frac Interference Monitoring
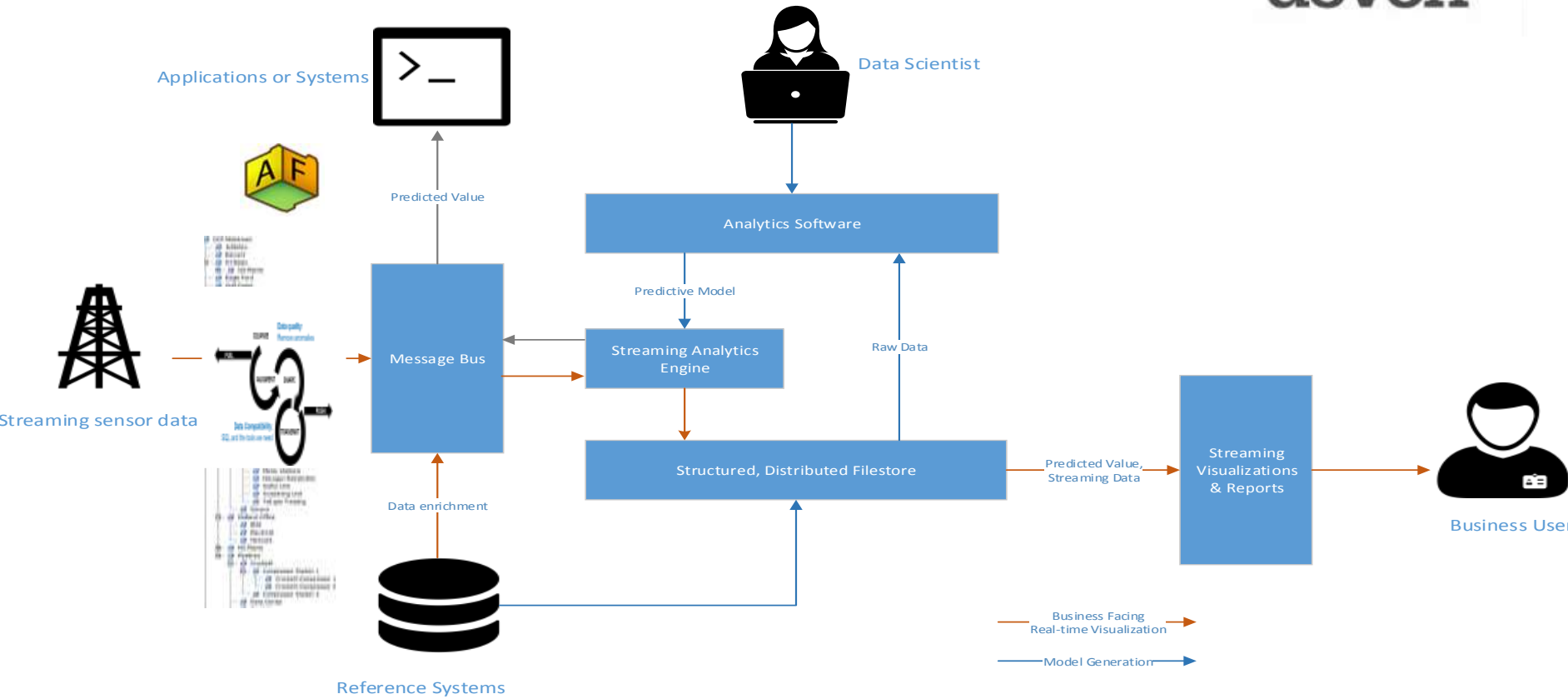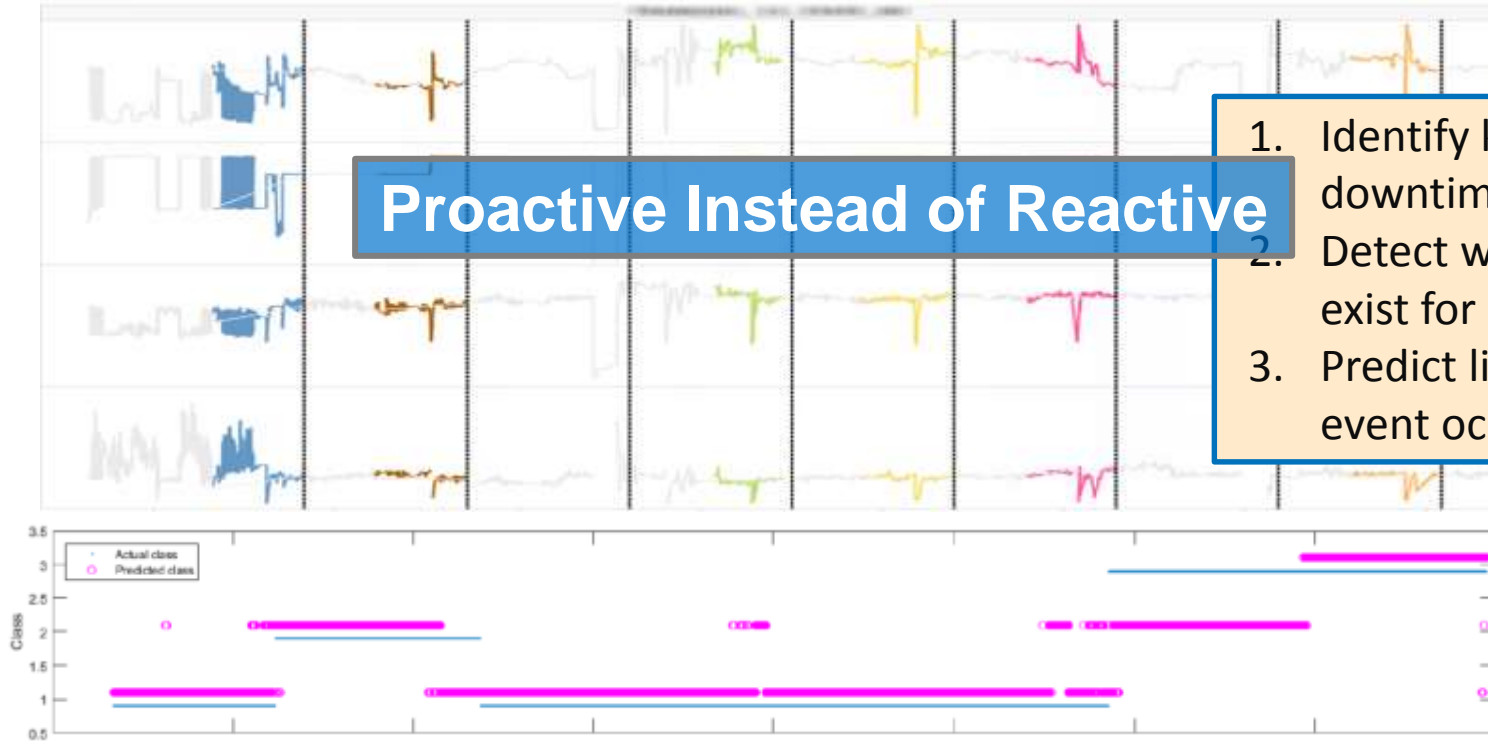
Coil Tubing Analysis – Community Model

Streaming In-Memory Analytics

Applications or Systems

Data Scientist

Analytics Software

Predicted Value

Predictive Model

Streaming Analytics Engine

Raw Data

Message Bus

Streaming sensor data

Structured, Distributed Filestore

Streaming Visualizations & Reports

Predicted Value, Streaming Data

Business User

Data enrichment

Reference Systems

Business Facing Real-time Visualization

Model Generation

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Drilling Analytics

Proactive Instead of Reactive

1. Identify key drivers for downtime event
2. Detect when conditions exist for event to occur
3. Predict likelihood for event occurrence

16

Devon ESP Lifecycle Tools: Real-time Analytics

OSIsoft Webinar Recording
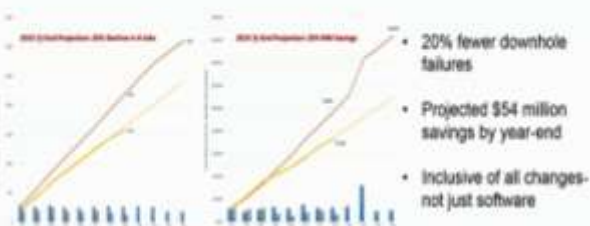
Best Practices

1. **Getting your PI AF Infrastructure in place is key – it is a journey. Evolve over time – structure and templates**

2. **Leverage PI AF smart asset templates & ownership by OT**

3. **Ask:**
   - Can we do this appilcation fully in the PI System?
   - If not,how do we leverage to simplify our application?

4. **Develop internal OT PI AF capabilities, support with IT**

5. **Rationalize where and what analytics are done**

Q&A

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